

**REMARKS**<sup>1</sup>

In the outstanding final Office Action, the Examiner objected to the Information Disclosure Statement; objected to the specification; rejected claims 14-20, 24-27, and 29 under 35 U.S.C. § 112, first paragraph; rejected claims 14-20, 24-27, and 29 under 35 U.S.C. § 112, second paragraph; rejected claim 14 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,619,680 to Nourshargh et al. (“Nourshargh”) in view of U.S. Patent No. 6,117,345 to Liu (“Liu”) and U.S. Patent No. 6,154,582 to Bazyleenko (“Bazyleenko”); rejected claims 15-17, 24-26 and 29 under 35 U.S.C. §103(a) as being unpatentable over Nourshargh in view of Liu and Bazyleenko as applied to claim 14, and in further view of U.S. Patent No. 3,850,604 to Klein (“Klein”); rejected claims 18-20 under 35 U.S.C. § 103(a) as being unpatentable over Nourshargh in view of Liu, Bazyleenko, and Klein, and in further view of U.S. Patent No. 4,915,810 to Kestigian (“Kestigian”), and rejected claim 27 under 35 U.S.C. § 103(a) as being unpatentable over Nourshargh in view of Liu and Bazyleenko as applied to claim 14, and in further view of U.S. Patent No. 6,615,614 to Makikawa (“Makikawa”).

By this amendment, Applicants have amended the specification for clarity. Applicants have also amended claims 14-20, 24, 25, and 29. Claims 14-29 remain pending in this application, with claims 14-20, 24-27, and 29 currently presented for examination.

I. **Objection to the Information Disclosure Statement**

Regarding the objection to the Information Disclosure Statement (IDS), the Examiner asserts that the IDS filed August 9, 2007, fails to comply with the provisions of 37 C.F.R. §§ 1.97, 1.98 and MPEP § 609 because the dates of publication for *at least one* non-patent

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<sup>1</sup> The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement of characterization in the Office Action.

document is not provided. As a result, the Examiner did not consider any of the documents listed therein. This practice, however, goes against the guidelines set forth in the MPEP, and is thus not proper.

The MPEP states

[I]f *an item* of information in an IDS fails to comply with all the requirements of 37 CFR 1.97 and 37 CFR 1.98, *that item* of information in the IDS *will not be considered* and a line should be drawn through the citation to show that it has not been considered. *However, other items of information that do comply with all the requirements of 37 CFR 1.97 and 37 CFR 1.98 will be considered by the examiner.* MPEP § 609.05(a), 8th Ed., Rev. 6, (September 2007) (emphasis added).

Accordingly, the Examiner's actions with respect to the IDS were improper. The Examiner should have considered all of the listed documents which complied with 37 C.F.R. §§ 1.97 and 1.98, and only not consider those documents which were not in compliance. Applicants therefore respectfully request that the Examiner adhere to the guidelines set forth in the MPEP and consider those items which are in compliance with 37 C.F.R. §§ 1.97 and 1.98.

For those references which allegedly do not comply with 37 C.F.R. §§ 1.97 and 1.98, Applicants will attempt to determine the publication dates, and submit an IDS citing these documents. Until that time, Applicants respectfully request that these references be placed in the file, in accordance with 37 C.F.R. § 1.97(i).

## II. Objection to the Specification

In the Office Action, the Examiner objected to the specification as allegedly "failing to provide proper antecedent basis for the claimed subject matter." Office Action, page 3. Although Applicants disagree with the Examiner's allegation, Applicants have amended the specification for clarity, and to provide antecedent basis for certain terms clearly illustrated in the originally-filed drawings, and used in the claims. Because the amendments to the specification

were merely to add verbal description to elements clearly present in the as-filed drawings, no new matter has been entered.

**III. Rejection under 35 U.S.C. § 112, first and second paragraphs**

Regarding the rejection of claims 14-20, 24-27, and 29 under 35 U.S.C. § 112, first and second paragraphs, the Examiner asserts that certain terms recited in the claims were not described in the specification, and/or indefinite. *See* Office Action, pages 4-6. Although Applicants disagree with the Examiner's assertions, Applicants have amended claims 14-20, 24, 25, and 29 in an attempt to expedite prosecution. Specifically, claims 14, 18, and 29 have been amended to recite "each of the plurality of ridge structures has a top surface and sidewalls," and "the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces formed between each ridge structure of the plurality of ridge structures." Support for this amendment may be found in Applicants' specification at, for example, FIGS. 1B, 1C, and 4B, and originally-filed paragraphs [0023] and [0038]. Moreover, as noted above, paragraphs [0023] and [0038] have been amended at the request of the Examiner to clarify these features clearly illustrated in FIGS. 1B, 1C, and 4B.

Addressing the Examiner's specific assertions, with respect to the Examiner's assertion that "[t]he term 'ridge structure' is indefinite as to its meaning" (Office Action, page 4), Applicants submit that the present amendment clarifies the meaning of "ridge structure." Specifically, claims 14, 18, and 29, have been amended to recite "a plurality of ridge structures," wherein "each of the plurality of ridge structures has a top surface and sidewalls," and there are "horizontal surfaces formed between each ridge structure of the plurality of ridge structures." FIG. 1B, for example, illustrates the claimed "ridge structures" 11 each have "a top surface" 16

and sidewalls 12, and “horizontal surfaces” 14 “formed between each ridge structure” 11.

Moreover, as noted above, paragraphs [0023] and [0038] have been amended at the request of the Examiner to clarify these features. In addition, Applicants note that the claimed “plurality of ridge structures” are also shown in the SEM image of Figure 8.

Regarding the Examiner assertion that “[t]he term ‘planar portion’ is indefinite as to its meaning” (Office Action, page 4), Applicants have amended the claims to remove this term. Instead, claims 14, 18, and 29, for example, now recite “horizontal surfaces,” which are not part of the claimed “ridge structures,” but rather “formed between each ridge structure.” This feature is clearly illustrated in FIGS. 1B, 1C, and 4B, for example, and also described in the specification at, for example, paragraphs [0023] and [0038].

Regarding the Examiner’s assertion that “[t]he term ‘ridge portion’ is indefinite” (Office Action, page 4), Applicants have amended the claims to remove this term. Claims 14, 18, and 29, for example, now recite that “each of the plurality of ridge structures has a top surface” (emphasis added). This feature is clearly illustrated in FIGS. 1B, 1C, and 4B, for example, and also described in the specification at, for example, paragraphs [0023] and [0038].

Regarding the Examiner’s alleged confusion with respect to the term “an entire surface,” Applicants have amended claims 14, 18, and 29, for example, to recite that “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces formed between each ridge structure of the plurality of ridge structures.” This feature is clearly illustrated in FIGS. 1B, 1C, and 4B, for example, and also described in the specification at, for example, paragraphs [0023] and [0038].

With respect to the Examiner’s alleged indefiniteness with respect to the comma in claim 15, Applicants have amended claim 15, as well as claim 18, to replace the comma with “and.”

Finally, with respect to the Examiner's alleged antecedent basis problems regarding "radio frequency power," Applicants have amended claims 16-19, 24, and 25 to more clearly define the claimed "radio frequency power."

Accordingly, amended claims 14, 18, and 29 are fully described and sufficiently defined in the specification and the drawings of this application. Applicants therefore respectfully request that the Examiner withdraw the rejection of claims 14, 18, and 29 and their respective dependent claims under 35 U.S.C. § 112, first and second paragraphs.

**IV. Rejections under 35 U.S.C. § 103(a)**

Applicants respectfully traverse the rejection of claims 14-20, 24-27, and 29 under 35 U.S.C. § 103(a). No *prima facie* case of obviousness is established.

The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. Such an analysis should be made explicit and cannot be premised upon mere conclusory statements. MPEP § 2142, 8th Ed., Rev. 6 (Sept. 2007). "A conclusion of obviousness requires that the reference(s) relied upon be enabling in that it put the public in possession of the claimed invention." MPEP § 2145. Furthermore, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art" at the time the invention was made. MPEP § 2143.01(III), internal citation omitted. Moreover, "[i]n determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." MPEP § 2141.02(I), internal citations omitted (emphasis in original).

“[T]he framework for the objective analysis for determining obviousness under 35 U.S.C. § 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1996). . . . The factual inquires . . . [include determining the scope and content of the prior art and] . . . [a]scertaining the differences between the claimed invention and the prior art.” MPEP § 2141(II). “Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art.” MPEP § 2141(III). In this application, a *prima facie* case of obviousness has not been established because the Office Action has neither properly determined the scope and content of the prior art nor properly ascertained the differences between the claimed invention and the prior art. Accordingly, the Office Action has failed to clearly articulate a reason why the prior art would have rendered the claimed invention obvious to one of ordinary skill in the art.

In examining the claims, the Examiner asserts that the limitations of at least independent claims 14, 18, and 29 have been interpreted to have “the broadest reasonable interpretation in [its] ordinary usage in context...” *See* Final Office Action mailed April 13, 2007, page 5 (cited by Examiner at page 6 of the outstanding Office Action). The Examiner further asserts that because “[t]here is no definition, disclosure or description of the claimed ‘entire area’ or ... ‘ridge portion’, sidewall portion’ and ‘planar portion,’ that “it is deemed that the claimed areas can be portions of any size, however small, and of any shape - and that there need not be any boundaries thereto - physical or otherwise.” *Id.* The Examiner then concludes that “‘ridge portion’ encompasses any portion . . . of a ridge,” “‘sidewall portion’ encompasses any portion . . . of a sidewall,” and “‘planar portion’ encompasses an portion . . . of the plane.” *Id.* Applicants respectfully disagree with the Examiner’s assertions and conclusion.

Claims 14, 18, and 29, as amended recite “plurality of ridge structures in a lower cladding layer of a first material, wherein ... each of the plurality of ridge structures has a top surface and sidewalls.” The claimed “top surface” thus specifically refers to the top surface of each of the claimed “plurality of ridge structures.” Similarly, the claimed “sidewalls” are sidewalls of the each of the claimed “plurality of ridge structures.” Moreover, the claimed “horizontal surface” is the horizontal surface “between each of the plurality of ridge structures.”

Moreover, these specific portions of the claimed “plurality of ridge structures” are clearly defined in Applicants’ specification and figures, as discussed above in sections II and III.

In previous Office Actions, the Examiner has noted that “[a]s seen by applicant’s figure 4A, part of sidewall is exposed, and thus is not completely covered.” Final Office Action mailed April 13, 2007, page 6 (relied upon by the Examiner in the outstanding Office Action). Applicants note that Fig. 4A is directed to an embodiment provided for illustrative purposes, and not necessarily the claimed embodiment.

For at least the foregoing reasons, Applicants respectfully submit that the Examiner’s interpretation of the claim elements, as set forth in previous Office Actions, and relied upon by the Examiner in the outstanding Office Action, is inconsistent with the specification, drawings, and the claims themselves, and is also not consistent with standard examining procedure. Accordingly, Applicants respectfully traverse the rejections because, no *prima facie* case of obviousness is established, as discussed below.

A. Claim 14

Regarding the rejection of claim 14 under 35 U.S.C. § 103(a), Nourshargh fails to disclose a combination including at least “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of

horizontal surfaces between each of the plurality of ridge structures,” as recited in amended claim 14. Nourshargh fails to teach or suggest at least this element.

Nourshargh teaches in Figs. 2(b) and 2(c), for example, a waveguide including a substrate 11, a groove 13, and a core glass 14. To the extent that top elevated surface of substrate 11, groove 14, and the vertical surface therebetween can reasonably be construed as respectively corresponding to Applicants’ claimed “top surface,” “horizontal surface,” and “sidewalls,” Fig. 2(c) clearly shows that “the entire surface” of vertical surface between top elevated surface of substrate 11 and groove 13 is not “completely and continuously cover[ed]” by core glass 14. That is, to the extent that the vertical surface between substrate 11 and groove 14 can reasonably be construed as corresponding to Applicants’ claimed “sidewalls,” Nourshargh clearly fails to disclose completely and continuously covering the vertical surface. Nourshargh thus fails to provide any disclosure of “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures,” as recited in amended claim 14.

Moreover, Nourshargh teaches:

the desired waveguide pattern is first written on a substrate 11 using photolithography ... core glass 14 is deposited on the substrate ... and by suitably controlling the amount of dopant in the core glass as the dopant in the core glass as the deposition process is carried out, it may have any desired refractive-index profile across its thickness which is less than the depth of the grooves 13 so that the waveguide is fully embedded within the grooves 13. Nourshargh, col. 2, lines 7-28 (emphasis added).

Thus, as further shown in Fig. 2(c), since the thickness of the core glass 14 is less than the depth of the grooves 13, core glass 14 does not “completely and continuously cover[ ] the entire surface” of vertical surface (characterized by the Examiner as allegedly corresponding to Applicants’ claimed “sidewalls”) between top elevated surface of substrate 11 and groove 13.

Nourshargh thus fails to teach or suggest a combination including “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures,” as recited in amended claim 14.

Liu fails to cure the deficiencies of Nourshargh. Liu generally teaches “[a] method for depositing dielectric material into gaps between wiring lines in the formation of a semiconductor device.” Liu, abstract. Liu, however, is silent as to at least a “core layer,” and thus cannot teach or suggest a combination including at least “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures,” as recited in amended claim 14. Moreover, Liu fails to provide any disclosure that amended claim 14 is obvious.

Bazylenko fails to cure the deficiencies of Nourshargh and Liu. Bazylenko teaches “[t]he core layer is then chemically etched (FIG. 10b) to produce a chemically etched step profile 19A.” Bazylenko, col. 9, lines 61-62. That is, Bazylenko teaches forming a core layer, and then etching a portion of the core layer. Because Bazylenko teaches removing a portion of the core layer, the core layer of Bazylenko cannot “completely and continuously cover[] an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures,” as recited in claim 14 (emphasis added). Thus, not only does Bazylenko fail to disclose this feature, Bazylenko teaches away from such a combination including the claimed feature.

As explained above, the elements of amended independent claim 14 are neither taught nor suggested by the cited references. Nor are the elements of independent claim 14 obvious in view of the cited references. Consequently, the Office Action has neither properly determined

the scope and content of the prior art nor properly ascertained the differences between the prior art and the claimed invention. Accordingly, no reason has been clearly articulated as to why the claim would have been obvious to one of ordinary skill in the art in view of the prior art. Therefore, a *prima facie* case of obviousness has not been established for independent claim 14.

For at least the above reasons, claim 14 is allowable. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 14 under § 103(a).

B. Claims 15-17, 24-26 and 29

Claims 15-17, and 24-26 depend from claim 14, and thus require all of the elements recited in claim 14. As discussed above, claim 14 is not obvious over Nourshargh in view of Liu and Bazyleenko. Accordingly, dependent claims 15-17, and 24-26 are also not obvious over these references.

Klein fails to cure the deficiencies of Nourshargh, Liu, and Bazyleenko. Klein teaches a general method for sputtering a target using, for example, an RF discharge. Klein, col. 4, lines 3-15. Klein, however, fails to teach or suggest at least the element, "the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures," as recited in amended claim 14, and required by dependent claims 15-17 and 24-26.

The elements of dependent claims 15-17 and 24-26 are thus neither taught nor suggested by the cited references. Nor are the elements of these dependent claims obvious in view of the cited references. Consequently, the Office Action has neither properly determined the scope and content of the prior art nor properly ascertained the differences between the prior art and the claimed invention. Accordingly, no reason has been clearly articulated as to why the claims

would have been obvious to one of ordinary skill in the art in view of the prior art. Therefore, a *prima facie* case of obviousness has not been established for claims 15-17 and 24-26.

For at least the above reasons, claims 15-17 and 24-26 are allowable. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 15-17 and 24-26 under § 103(a).

C. Claim 29

Claim 29, as amended, contains elements similar to those recited in claim 14. For example, claim 29 recites a combination including at least “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures,” as also recited in amended claim 14, and required by claims 15-17 and 24-26. As discussed above, a combination including at least this element is not obvious over Nourshargh, Liu, Bazylenko, and Klein teach or suggest at least this element.

Therefore, for at least the reasons presented above with respect to claims 14-17 and 24-26, a *prima facie* case of obviousness is not established with respect to claim 29, nor is claim 29 obvious in view of the applied references. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claim 29 under 35 U.S.C. § 103(a).

D. Claims 18-20

Claim 18 recites a combination including at least “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures.” As discussed above, neither Nourshargh, nor Liu, nor Bazylenko, nor Klein teach or suggest at least

this element, nor is a combination including at least this feature obvious in view of these references.

Kestigian further fails to cure the deficiencies of Nourshargh, Liu, Bazyleenko, and Klein. Kestigian teaches a method for forming targets for use in ion beam sputtering. Kestigian, abstract. Kestigian's method involves the formation of targets wherein plugs with different compositions can be inserted into a plurality of holes formed in the target. *Id.* at col. 3, lines 12-25. Kestigian, however, does not teach or suggest the formation of waveguides or core layers. Thus, Kestigian fails to teach or suggest at least a combination including, "the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures," as recited in amended claim 18.

The elements of amended independent claim 18 are thus neither taught nor suggested by the cited references. Nor are the elements of independent claim 18 obvious in view of the cited references. Consequently, the Office Action has neither properly determined the scope and content of the prior art nor properly ascertained the differences between the prior art and the claimed invention. Accordingly, no reason has been clearly articulated as to why the claim would have been obvious to one of ordinary skill in the art in view of the prior art. Therefore, a *prima facie* case of obviousness has not been established for independent claim 18.

For at least the above reasons, claim 18 is allowable. Moreover claims 19 and 20 depend from claim 18, and are allowable at least due to their dependence. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988). Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claims 18-20 under 35 U.S.C. § 103(a).

E. Claim 27

Claim 27 depends from claim 14, and thus requires all of the elements of claim 14. As discussed above, neither Nourshargh, nor Liu, nor Bazylenko, nor Klein teach or suggest at least a combination including “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures,” as recited in amended claim 14 and required by claim 27, nor is a combination including at least this feature obvious in view of the cited references. Makikawa fails to cure the above-noted deficiencies of these references.

Makikawa generally discloses a method for preparing an optical waveguide substrate. As shown in FIG 1 (c)-(d), Makikawa teaches depositing a core layer 14 in grooves 12, and over oxidized substrate 13. Makikawa further teaches, however, that:

the surface of the resulting structure is abraded off until the substrate is exposed and a flat surface is defined ... [a]brasition is preferably continued until the buried portions of the core film are abrade several microns. This results in the substrate in which the core film segments 14 and the under clad film 13 are present on the same substrate surface. Makikawa, col. 3, lines 34-46.

Accordingly, this cannot constitute a teaching of “the core layer completely and continuously covers an entire surface of the top surface, an entire surface of the sidewalls, and an entire surface of horizontal surfaces between each of the plurality of ridge structures,” as recited in claim 14 and required by claim 27.

The elements of dependent claim 27 is thus neither taught nor suggested by the cited references. Nor are the elements of this dependent claims obvious in view of the cited references. Consequently, the Office Action has neither properly determined the scope and content of the prior art nor properly ascertained the differences between the prior art and the claimed invention. Accordingly, no reason has been clearly articulated as to why the claim

would have been obvious to one of ordinary skill in the art in view of the prior art. Therefore, a *prima facie* case of obviousness has not been established for claim 27.

For at least the above reasons, claim 27 is allowable. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 27 under § 103(a).

In view of the foregoing amendments and remarks, Applicants submit that this claimed invention, as amended, is not rendered obvious in view of the prior art references cited against this application. Applicants therefore request the Examiner's reconsideration of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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